CELL ARRAY AND METHOD OF MULTIRESOLUTION MOTION ESTIMATION AND COMPENSATION

ABSTRACT OF THE DISCLOSURE

A method, apparatus, computer medium, and other embodiments for motion estimation and compensation processing of video and image signals are described. Within a sequence of frames, block-based differences are taken between frames to exploit redundancies between pictures by taking a matchblock from the current picture and by determining a spatial offset in a corresponding reference picture which signifies a good prediction of where the current macroblock can be found. Multi-level motion estimation is performed in three stages to refine the resolution of the motion vector with reduced computational bandwidth. First, a matchblock from a reference frame is decomposed equally into several sub-matchblocks, each of which is searched in parallel over a search area decomposed into sub-blocks by a similar factor so as to determine a preliminary motion vector in the reference picture. Second, a full size matchblock is then searched over a refined search area using the preliminary motion vector to determine an intermediate motion vector, so as to refine the resolution of the preliminary motion vector. Third, fractional-pixel searching is then performed on the matchblock and the intermediate motion vector to determine a final motion vector having an even higher resolution associated with the best motion vector to be used in predicting the current macroblock. In one embodiment, a processor-based motion estimation and compensation cell array enables contemporaneous and independent loading and processing operations in parallel.